

Amendment After Allowance dated September 28, 2007

AMENDMENTS TO THE CLAIMS

1. (Previously presented) A process for rendering a polyamine-epihalohydrin resin storage stable, comprising:

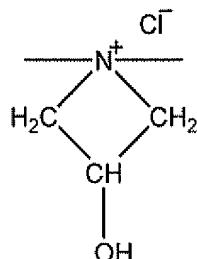
treating a composition containing a polyamine-epihalohydrin resin, the composition comprising a solids content of at least 15 wt% and including CPD-forming species, and wherein the resin is formed in a reaction having a molar ratio of epihalohydrin to secondary amine group of less than 0.50, with at least one enzymatic agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelatin storage stable reduced CPD-forming resin so that the composition containing the reduced CPD-forming polyamine-epihalohydrin resin when stored for 24 hours at 50°C, and a pH of about 1.0 releases less than about 100 ppm dry basis of CPD, wherein the solids content of the composition containing a polyamine-epihalohydrin resin is at least 15 wt% when treated with the at least one enzymatic agent and wherein the at least one enzymatic agent is selected from the group consisting of an esterase, a lipase, a protease or a combination thereof.
2. (Original) The process according to claim 1, wherein the composition containing the reduced the CPD-forming polyamine-epihalohydrin resin when stored for 24 hours at 50°C, and a pH of about 1.0 releases less than about 50 ppm dry basis of CPD.
3. (Original) The process according to claim 1, wherein the treatment conditions comprise a temperature of from about 20°C to 60°C.
4. (Original) The process according to claim 3, wherein the treatment conditions comprise a temperature of from about 20°C to 40°C.
5. (Original) The process according to claim 1, wherein the treatment conditions comprise a reaction time of from about 30 minutes to about 96 hours.
6. (Original) The process according to claim 5, wherein the treatment conditions comprise a reaction time of from about 2 hours to about 12 hours.

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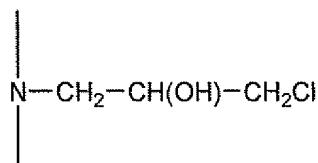
7. (Original) The process according to claim 1, wherein the treatment conditions comprise a pH of from about 2.5 to about 9.
8. (Previously presented) The process according to claim 7, wherein the treatment conditions comprise a pH of from about 6 to about 9.
9. (Original) The process according to claim 8, wherein the treatment conditions comprise a pH from about 6 to about 8.5.
10. (Original) The process according to claim 1, wherein the ratio of at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:1600 to about 1:1.5.
11. (Original) The process according to claim 10, wherein the ratio of at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:160 to about 1:4.
12. (Original) The process according to claim 1, wherein the ratio of at least one enzymatic agent (active enzyme, dry basis) to polyamine-epihalohydrin resin (dry basis) is from about 0.04:1600 to about 0.04:1.5.
13. (Original) The process according to claim 1, wherein the solids content is 15 to 50 wt% active solids, the treatment conditions comprise a temperature of from about 0°C to about 35°C, a reaction time of from about 4 to about 24 hours, a pH of from about 6.9 to about 7.9, the ratio of at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:20 to about 1:8.
14. (Cancelled)
15. (Original) The process according to claim 1, wherein the at least one enzymatic agent is a protease in the subtilisin group.
16. (Original) The process according to claim 1, wherein the at least one enzymatic agent has esterase activity.

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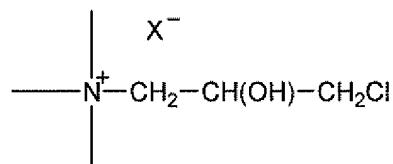
17. (Original) The process according to claim 1, wherein the at least one enzymatic agent is produced from a microorganism selected from the group consisting of *Bacillus licheniformis* (Swiss-Prot Accession Number: P00780), or *Bacillus amyloliquifaciens* (P00782), and *Bacillus lentus* (P29600).
18. (Previously presented) The process according to claim 1, wherein the at least one enzymatic agent is in the subtilisin group.
19. (Original) The process according to claim 1, wherein the resin is characterized by the presence of the functionality represented by the formula:



20. (Original) The process according to claim 1, wherein the resin is characterized by the presence of the functionality represented by the formula:



21. (Original) The process according to claim 1, wherein the resin is characterized by the presence of the functionality represented by the formula:



wherein X is an anion.

Claims 22-34 (Cancelled)

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35. (Original) The process according to claim 1, wherein, simultaneously, prior to or subsequent to the treating a composition containing polyamineepihalohydrin resin to obtain a reduced CPD-forming resin, the resin is treated to reduce at least one of epihalohydrins, epihalohydrin hydrolysis by-products and organic halogen bound to the polymer backbone.
36. (Previously presented) A process for preparing a paper product, comprising:

treating a composition containing a polyamine-epihalohydrin resin, the composition comprising a solids content of at least 15 wt% and including CPD-forming species, and wherein the resin is formed in a reaction having a molar ratio of epihalohydrin to secondary amine group of less than 0.50, with at least one enzymatic agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelatin storage stable reduced CPD-forming resin, and forming a paper product with the reduced CPD-forming polyamine-epihalohydrin resin, so that a paper product, when corrected for adding at about a 1 wt% addition level of the reduced CPD-forming resin, contains less than about 250 ppb of CPD, wherein the solids content of the composition containing a polyamine-epihalohydrin resin is at least 15 wt% when treated with the at least one enzymatic agent and wherein the at least one enzymatic agent is selected from the group consisting of an esterase, a lipase, a protease or a combination thereof.
37. (Previously presented) The process according to claim 36, wherein the paper product, when corrected for adding at about a 1 wt% addition level of the reduced CPD-forming resin, contains less than about 50 ppb of CPD.
38. (Previously presented) The process according to claim 36, wherein the solids content is 15 to 50 wt% active solids, the temperature of the reaction is from about 0°C to about 35°C, the reaction time is from about 4 to 24 hours and the pH of the reaction is from about 6.9 to about 7.9, the ratio of at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:20 to about 1:8.

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39. (Cancelled)
40. (New) The process according to claim 1, wherein at least one of simultaneously with, prior to or subsequent to the treating a composition containing polyamine-epihalohydrin resin to obtain a reduced CPD-forming resin, the resin is contacted with at least one microorganism or at least one enzyme isolated from said at least one microorganism in an amount and at a pH and temperature effective to dehalogenate residual quantities of organically bound halogen.
41. (New) The process according to claim 40, wherein said at least one microorganism or at least one enzyme isolated from said at least one microorganism is a hydrogen halide lysase type dehalogenase.
42. (New) The process according to claim 40, wherein said at least one microorganism or at least one enzyme isolated from said at least one microorganism comprises at least one of *Arthrobacter histidinolovorans* (HK1) and *Agrobacterium radiobacter* (HK7).
43. (New) The process according to claim 40, wherein said at least one microorganism comprises a mixture comprising at least one of *Agrobacterium radiobacter* (HK7) and *Arthrobacter histidinolovorans* (HK1).
44. (New) The process according to claim 1, wherein, simultaneously with the treating a composition containing polyamine-epihalohydrin resin to obtain a reduced CPD-forming resin, the CPD-forming resin is contacted with at least one microorganism or at least one enzyme isolated from said at least one microorganism in an amount and at a pH and temperature effective to dehalogenate residual quantities of organically bound halogen.
45. (New) The process according to claim 44, wherein the treatment conditions comprise a reaction time of 48 hours or less.
46. (New) The process according to claim 44, wherein the temperature is from about 20 °C to 35 °C.

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47. (New) The process according to claim 44, wherein the treatment conditions comprise a pH of from about 6.5 to 8.0.
48. (New) The process according to claim 44, wherein said at least one microorganism or at least one enzyme isolated from said at least one microorganism is a hydrogen halide lysase type dehalogenase.
49. (New) The process according to claim 44 wherein said at least one microorganism or at least one enzyme isolated from said at least one microorganism comprises at least one of *Arthrobacter histidinolovorans* (HK1) and *Agrobacterium radiobacter* (HK7).
50. (New) The process according to claim 44, wherein said at least one microorganism comprises a mixture comprising at least one of *Agrobacterium radiobacter* (HK7) and *Arthrobacter histidinolovorans* (HK1).
51. (New) The process according to claim 44, wherein the treatment conditions comprise a reaction time of 48 hours or less, a temperature of from about 20 °C to 35 °C, a pH of from about 6.5 to about 8.0, and the ratio of at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:1600 to about 1:1.5 and said at least one microorganism comprises a mixture comprising at least one of *Agrobacterium radiobacter* (HK7) and *Arthrobacter histidinolovorans* (HK1).
52. (New) The process according to claim 44, wherein the ratio of said at least one enzymatic agent to polyamine-epihalohydrin resin (dry basis) is from about 1:1600 to about 1:1.5.